Background: Data sniffers may be used to identify potentially life-threatening medical conditions to allow more timely institution of appropriate medical therapy. Algorithms are developed to search the OR Datamart for clinical data consistent with these life-threatening conditions.

Malignant hyperthermia is a rare but life-threatening complication of general anesthesia. Patients present with nonspecific signs and symptoms of skeletal muscle hypermetabolism and ischemia triggered by volatile anesthetic agents or depolarizing neuromuscular blocking agents.1 A clinical grading scale to predict malignant hyperthermia susceptibility was developed in 1994.2 The Malignant Hyperthermia Association of the United States (MHAUS) currently collects data from suspected cases of malignant hyperthermia using the Adverse Metabolic or Muscular Reaction to Anesthesia (AMRA) forms.3 These tools were designed to be used after a clinical episode concerning for malignant hyperthermia has occurred.

We developed a data sniffer based on physiologic criteria that would identify potential cases of malignant hyperthermia. This tool can be adapted to clinical practice to alert the anesthesia provider in real time that a patient’s clinical condition is concerning for malignant hyperthermia. Such a tool will allow earlier dantrolene therapy for suspected malignant hyperthermia. Early therapy with dantrolene reduces the morbidity and mortality of malignant hyperthermia.4

Methods: We reviewed cases of malignant hyperthermia at Mayo Clinic in Rochester, MN since 2003. Using the ICD-9 code 995.86, we identified 58 patients with malignant hyperthermia as a discharge diagnosis. Of these 58 patients, only 6 had significant intra-operative events concerning for malignant hyperthermia. We developed a query of the OR Datamart based on chart review and literature search. We searched for patients with ETCO2 ≥ 55 mmHg, increase in ETCO2 of 10 mmHg or more over 30 minutes, temperature ≥ 37.5 °C and temperature increase of 1 °C or more over 30 minutes. This query was applied to our case control subjects as well as all operating room patients from January 2012 through June 2012. Our criteria identified 6 of our 6 case controls, and 132 patients out of 51,579 anesthetic exposures (0.26%). A real-time data sniffer based on these criteria is sensitive enough to capture cases suspicious for malignant hyperthermia, while limiting false positives to prevent alarm fatigue.

Conclusion: Development of a malignant hyperthermia data sniffer is feasible. Implementing this data sniffer into clinical care has the potential to notify the anesthesia provider of clinical conditions consistent with malignant hyperthermia such that appropriate treatment may be initiated in a timely fashion.

References